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BOOK ANNOUNCEMENTS

IAN ANDERSON, A First Course in Combinatorial Mathematics. Oxford Applied Mathematics and Computing Sciences Series (Oxford University Press, 1974) viii + 122 pp., $ 4.25 Canadian (paper) $ 11.95 Canadian (cloth).

1. Introduction to Basic Ideas. 2. Selections and Binomial Coefficients. 3. Pairings Problems. 4. Recurrence. 5. The Inclusion-Exclusion Principle. 6. Block Designs and Error-Correcting Codes. 7. Steiner Systems and Sphere Packings. Solutions to Exercises. Bibliography. Index.

PETER W. BECKER, Recognition of Patterns: Using the Frequencies of Occurrence of Binary Words. Second, revised edition (Springer-Verlag, Berlin, 1974) xiv + 215 pp., $ 14.00 U.S.

1. Problems in the Design of Pattern Recognizers. 2. Design of a Pattern Recognizer using the Frequency of Occurrence of Binary Words Method. 3. Computational Rules for Binary Word Frequencies of Occurrence. 4. s, A Measure of Separability. 5. Modeling of Pattern Generating Stochastic Processes. 6. The Heuristic Search Procedure. 7. Hardware Implementation. 8. Summary. Bibliography.

NORMAN BIGGS, Algebraic Graph Theory. Cambridge Tracts in Mathematics (Cambridge University Press, London, 1974) vi + 170 pp., £ 4.00 U.K., $ 11.50 U.S.A.

Introduction. *Part One — Linear Algebra in Graph Theory.* The spectrum of a graph. Regular graphs and line graphs. The homology of graphs. Spanning trees and associated structures. Complexity, Determinant expansions. *Part Two — Colouring Problems.* Vertex-colourings and the spectrum. The chromatic polynomial. Edge-subgraph expansions. The logarithmic transformation. The vertex-subgraph expansion. The Tutte polynomial. The chromatic polynomial and spanning trees. *Part Three — Symmetry and Regularity of Graphs.* General properties of graph automorphisms. Vertex-transitive graphs. Symmetric graphs. Trivalent symmetric graphs. The covering-graph construction. Distance-transitive graphs. The feasibility of intersection arrays. Primitivity and imprimitivity. Minimal regular graphs with given girth. Bibliography. Index.

AUBERT DAIGNEAULT, ed., Studies in Algebraic Logic. Volume 9. The Mathematical Association of America Studies in Mathematics (The Mathematical Association of America Inc., Providence, Rhode Island, U.S.A., 1974) vii + 207 pp.

Introduction (Aubert Daigneault). Unification and Abstraction in Algebraic Logic (William Craig). Connections between Combinatorial Theory and Algebraic Logic (J. Donald Monk). Post Algebras as a Semantic Foundation of m-Valued Logics (Helena Rasiowa). From Sheaves to Logic (Gonzalo E. Reyes). Index.

SVEN DANØ, Linear Programming in Industry. Theory and Applications. An Introduction. Fourth edition (Springer-Verlag, Berlin, 1974) viii + 172 pp.

I. Introduction. II. Elements of the Mathematical Theory of Linear Programming. III. A Practical Example. IV. Industrial Applications. V. Computational Procedures for Solving Linear Programming Problems. VI. Duality in Linear Programming. VII. Sensitivity Analysis and Parametric Programming. VIII. Integer Linear Programming. IX. Decomposition. X. Appendix A: Proof of the Fundamental Theorem, B: The Simplex Criterion, C: The Simplex Algorithm, D: Proof of the Duality Theorem, E: Gomory's Algorithms for Integer Programming, F: A Decomposition Theorem. References. Index.

G.B. DANTZIG and B.C. EAVES, eds., Studies in Optimization. Volume 10. The Mathematical Association of America Studies in Mathematics (The Mathematical Association of America Inc., Providence, Rhode Island, U.S.A., 1974) 180 pp., $ 5.00 U.S.

Introduction (G.B. Dantzig and B.C. Eaves). Combinatorial Algebra of Linear Program, (A.W. Tucker). Complementary Pivot Theory of Mathematical Programming (R.W. Cottle and G.B.

Dantzig). "Steiner's" Problem Revisited (H.W. Kuhn). Properly Labeled Simplexes (B.C. Eaves). Bottleneck Extrema (Jack Edmonds and D.R. Fulkerson). On Cores and Indivisibility (Herbert Scarf and Lloyd Shapley). Markov Decision Chains (A.F. Veinott, Jr.). The Decomposition Algorithm for Linear Programs (G.B. Dantzig and Philip Wolfe). Index

PAUL R. HALMOS, Naive Set Theory. Undergraduate Texts in Mathematics (Springer-Verlag, Berlin, 1974) vii + 104 pp., $ 6.80 U.S.A.

1. The Axiom of Extension. 2. The Axiom of Specification. 3. Unordered Pairs. 4. Unions and Intersections. 5. Complements and Powers. 6. Ordered Pairs. 7. Relations. 8. Functions. 9. Families. 10. Inverses and Composites. 11. Numbers. 12. The Peano Axioms. 13 Arithmetic. 14. Order. 15. The Axiom of Choice. 16. Zorn's Lemma. 17. Well Ordering. 18. Transfinite Recursion 19. Ordinal Numbers. 20. Sets of Ordinal Numbers. 21. Ordinal Arithmetic. 22. The Schröder–Bernstein Theorem. 23. Countable Sets. 24. Cardinal Arithmetic. 25. Cardinal Numbers. Index.

P.L. HAMMER and G. ZOUTENDIJK, eds., Mathematical Programming in Theory and Practice. Proceedings of the NATO Advanced Study Institute, Figueira da Foz, Portugal, June 12–23, 1972, organized by A.S. Gonçalves (North-Holland Publishing Company, Amsterdam, 1974) viii + 482 pp., Dfl. 80.00.

Preface. Test of Optimality (S. Vajda). The Significance of Recent Developments in Mathematica. Programming Systems (E.M.L. Beale). Unconstrained Minimization and Extensions for Constraints (M.J.D. Powell). On Linearly Constrained Nonlinear Programming and some Extensions (G. Zoutendijk). A Simplicial Method for Nonlinear Programming (A.S. Gonçalves). Some Applications of Nonlinear Optimization (L. Collatz). Nonconvex Quadratic Programs, Linear Complementarity Problems, and Integer Linear Programs (F. Giannessi and F. Tomasin). Min-Max Problems (B. Lemaire) Stochastic Programs with Simple Recourse (W.T. Ziemba). A Constraint-Activating Outer Polar Method for Solving Pure or Mixed Integer 0–1 Programs (E. Balas). Boolean Procedures for Bivalent Programming (P.L. Hammer). On Polaroid Intersections (C.-A. Burdet). The Routing of a Minimal Circular Flow (M.S. Rosa). Goal Programming (W.L. Price). The DOAE Reinforcement and Redeployment Study: A Case Study in Mathematical Programming (E.M.L. Beale, G.C. Beare and P. Bryan Tatham). Choosing Investment Portfolios when the Returns have Stable Distributions (W.T. Ziemba).

HAROLD R. JACOBS, Geometry (W.H. Freeman and Company, San Francisco, California, 1974) 701 pp., $ 9.00 U.S.

1. The Nature of Deductive Reasoning. 2. Fundamental Ideas: Lines and Angles. 3 Some Basic Postulates and Theorems. 4. Congruent Triangles. 5. Transformations. 6. Inequalities. 7. Parallel Lines. 8. Quadrilaterals. 9. Area. 10. Similarity. 11. The Right Triangle. 12. Circles. 13. The Concurrence Theorems. 14. Regular Polygons and the Circle. 15. Geometric Solids. 16. Non-Euclidean Geometries. Index.

ROBERT R. KORFHAGE, Discrete Computational Structures. Computer Science and Applied Mathematics (Academic Press Inc., New York/London, 1974) xiii + 381 pp., £ 6.70 U.K. $ 13.95 U.S.A.

Chapter 1. Basic Forms and Operations. Chapter 2. Undirected Graphs. Chapter 3. Gorn Trees. Chapter 4. Directed Graphs. Chapter 5. Formal and Natural Languages. Chapter 6. Finite Groups and Computing. Chapter 7. Partial Orders and Lattices. Chapter 8. Boolean Algebras. Chapter 9. The Propositional Calculus. Chapter 10. Combinatorics. Chapter 11. Systems of Distinct Representatives. Chapter 12. Discrete Probability. Answers and Hints for Selected Exercises. Index.

JULIUS T. TOU and RAFAEL C. GONZALEZ, Pattern Recognition Principles (Addison-Wesley Publishing Company, Reading, MA, 1974) 377 pp.

Series Editor's Foreword. Preface. Notation. 1. Introduction. 2. Decision Functions. 3. Pattern Classification by Distance Functions. 4. Pattern Classification by Likelihood Functions. 5. Trainable Pattern Classifiers — The Deterministic Approach. 6. Trainable Pattern Classifiers — The Statistical Approach. 7. Pattern Preprocessing and Feature Selection. 8. Syntactic Pattern Recognition. Bibliography. Index.

JULIUS T. TOU and RAFAEL C. GONZALEZ, Solutions Manual for Pattern Recognition Principles (Addison-Wesley Publishing Company, Reading, MA 1975) 108 pp.

M. ZELENY, Linear Multiobjective Programming. Lecture Notes in Economic and Mathematical Systems, Operations Research no 95 (Springer-Verlag, Berlin, 1974) x + 220 pp.

Introduction. The Origin of the Multiobjective Problem and a Short Historical Review. Linear Multiobjective Programming. Comment on Notation. *Linear Multiobjective Programming I.* Basic Theory and Decomposition of the Parametric Space. Basic Theory — Linear Case. Reduction of the Dimensionality of the Parametric Space. Decomposition of the Parametric Space as a Method to Find Nondominated Extreme Points of X. Algorithmic Possibilities. Discussion of Difficulties connected with the Decomposition Method. Some Numerical Examples of the Difficulties *Linear Multiobjective Programming II.* Finding Nondominated Extreme Points — A Second Approach (Multicriteria Simplex Method). Basic Theorems. Methods of Generating Adjacent Extreme Points. Computerized Procedure — An Example. Computer Analysis. *Linear Multiobjective Programming III.* A Method for Generating All Nondominated Solutions of X. Some Basic Theorems on Properties of N. An Algorithm for Generating N from Known N_{e_1}. Numerical Examples. An Example of Matrix Reduction. An Example of Nondominance Subroutine. Additional Topics and Extensions. Alternative Approach to Finding N_{e_1}. The Concept of Cutting Hyperplane. Nondominance in Lower Dimensions. Some Notes on Nonlinearity. A Selection of the Final Solution. Direct Assessment of Weights. The Ideal Solution. Entropy as a Measure of Importance. A Method of Displaced Ideal. Bibliography. Appendix: A1. A Note on Elimination of Redundant Constraints. A2. Examples of Output Printouts. A3. The Program Description and FORTRAN Printout.

STANLEY ZIONTS, Linear and Integer Programming (Prentice-Hall, Inc., Englewood Cliffs, NJ, U.S.A., 1974) xiv + 514 pp., $ 16.95 (cloth).

1. Introduction. 2. Mathematical Foundations and Interpretations of Linear Programming. 3. The Simplex Method. 4. Implementing the Simplex Method. 5. Duality and Its Significance. 6. Primal-Dual Algorithms and the Criss-Cross Method. 7. Postoptimality Analysis and Parametric Programming. 8. Specially Structured Linear Programming Problems: Bounded Variables, Generalized Upper Bounds, and Decomposition. 9. Specially Structured Linear Programming Problems: Network Flow Methods. 10. Game Theory and Related Topics. 11. Applying Linear Programming to Problems. 12. Integer Programming — An Introduction. 13. The use of Cuts in Integer Programming. 14. The Group Theoretic Approach to Solving Integer Programming Problems. 15. Branch and Bound Algorithms of Integer Programming. 16. Implicit Enumeration, Surrogate Constraints, and a Partitioning Method for Mixed-Integer Programming Problems. 17. Some Practical Aspects of Solving Integer Programming Problems. Index.